CLAIMS

1. A hybrid driving unit, comprising:

an input shaft for inputting motive power from an internal combustion engine;

an output shaft disposed on an axis in line with said input shaft and interlocking with driving wheels;

a first electric motor disposed on said axis and having a stator and a rotor;

a power splitting planetary gear disposed on said axis and having a first rotary element coupled with said input shaft, a second rotary element coupled with said rotor of said first electric motor and a third rotary element coupled with said output shaft;

a second electric motor disposed on said axis and having a stator and a rotor; and

a transmission disposed on said axis and shifting and transmitting revolution of said rotor of said second electric motor to said output shaft; and

said hybrid driving unit being characterized in that:

said first electric motor, said power splitting planetary gear, said second electric motor and said transmission are stored in a casing member while being disposed in line on said axis;

said stators of said first and second electric motors are fixed to said casing member;

said casing member is provided, at the front end thereof, with a coupling section which can be fixed to said internal combustion

engine and at the rear end thereof, with a mounting section which can be supported by a body; and

one of said first and second electric motors is disposed in the rearmost part among said first electric motor, said power splitting planetary gear, said second electric motor and said transmission disposed in said casing member along said axis.

2. The hybrid driving unit as set forth in Claim 1, characterized in that supporting members extending from said casing member support the both sides of said rotor of said electric motor, among said first and second electric motors, disposed in the rearmost end through an intermediary of bearing members; and

said mounting section is provided at the position axially overlapping with said rear supporting member among said supporting members.

3. The hybrid driving unit as set forth in Claim 2, characterized in that said output shaft is disposed through the inner peripheral side of one of said first and second electric motors and is supported by said rotor of the one of said first and second electric motors through an intermediary of bearing members.

4. The hybrid driving unit as set forth in Claim 1, characterized in that the other one of said first and second electric motors is disposed in the foremost part among said first electric motor, said power splitting planetary gear, said second electric motor and said transmission disposed on said axis in said casing member.

5. The hybrid driving unit as set forth in Claim 4,

characterized in that supporting members extending from said casing member support said rotor of the other one of said first and second electric motors through an intermediary of bearing members, and input shaft is coupled with said power splitting planetary gear through the inner peripheral side of said rotor of the other one and is supported by the rotor of the other one through an intermediary of bearing members.

6. The hybrid driving unit as set forth in Claim 4, characterized in that said first electric motor, said transmission, said power splitting planetary gear and said second electric motor are disposed in order from the side closer to said internal combustion engine.

7. The hybrid driving unit as set forth in Claim 6, characterized in that said input shaft passes through the inner peripheral side of said first electric motor and said transmission and is coupled with said first rotary element, and said output shaft passes through the inner peripheral side of said transmission and said second electric motor.

8. The hybrid driving unit as set forth in Claim 7, characterized in that said power splitting planetary gear comprises a single pinion planetary gear train;

said input shaft passes through the inner peripheral side of said power splitting planetary gear and is coupled with said transmission side of a carrier of said single pinion planetary gear train;

said output shaft passes through between said power splitting

planetary gear and said transmission and is coupled with a ring gear of said single pinion planetary gear train; and

said rotor of said first electric motor is coupled with a sun gear of said single pinion planetary gear train.

9. The hybrid driving unit as set forth in Claim 7, characterized in that said power splitting planetary gear comprises a single pinion planetary gear train;

said input shaft passes through between said first electric motor and said power splitting planetary gear and is coupled with said carrier of said single pinion planetary gear train on the side of said first electric motor;

said output shaft is coupled with said sun gear of said single pinion planetary gear; and

said rotor of said first electric motor is coupled with said ring gear of said single pinion planetary gear.

10. The hybrid driving unit as set forth in Claim 7, characterized in that said power splitting planetary gear comprises a double pinion planetary gear train;

said input shaft passes through the inner peripheral side of said power splitting planetary gear and is coupled with said ring gear of said double pinion planetary gear train;

said output shaft passes through the outer peripheral side of said power splitting planetary gear and between said rotor of said first electric motor and said power splitting planetary gear and is coupled with the carrier of said double pinion planetary gear train on the first electric motor side; and

said rotor of said first electric motor is coupled with said sun gear of said double pinion planetary gear train.

11. The hybrid driving unit as set forth in Claim 7, characterized in that said power splitting planetary gear comprises a double pinion planetary gear train;

said input shaft passes through between said first electric motor and said power splitting planetary gear and is coupled with the ring gear of said double pinion planetary gear train;

said output shaft is coupled with the sun gear of said double pinion planetary gear; and

said rotor of said first electric motor is coupled with the carrier of said double pinion planetary gear on the transmission side through the outer peripheral side of said power splitting planetary gear.

12. The hybrid driving unit as set forth in Claim 1, characterized in that said power splitting planetary gear, said first electric motor, said transmission and said second electric motor are disposed in order from the side closer to said internal combustion engine.

13. The hybrid driving unit as set forth in Claim 12, characterized in that said output shaft passes through the inner peripheral side of said power splitting planetary gear, said first electric motor, said transmission and said second electric motor.

14. The hybrid driving unit as set forth in Claim 13, characterized in that said power splitting planetary gear comprises a single pinion planetary gear train;

said input shaft is coupled with the front side of said carrier of said single pinion planetary gear train;

said output shaft is coupled with the sun gear of said single pinion planetary gear train; and

said rotor of said first electric motor is coupled with the ring gear of said single pinion planetary gear train.

15. The hybrid driving unit as set forth in Claim 13, characterized in that said power splitting planetary gear comprises a single pinion planetary gear train;

said input shaft is coupled with the carrier of said single pinion planetary gear train on the side of the first electric motor;

said output shaft is coupled with the ring gear of said single pinion planetary gear through the part between said power splitting planetary gear and said first electric motor; and

said rotor of said first electric motor is coupled with the front side of said carrier of said single pinion planetary gear through the outer peripheral side of said power splitting planetary gear.

16. The hybrid driving unit as set forth in Claim 13, characterized in that said power splitting planetary gear comprises a double pinion planetary gear train;

said input shaft is coupled with the ring gear of said double pinion planetary gear train;

said output shaft is coupled with said carrier of said single pinion planetary gear train through the part between said input shaft and said power splitting planetary gear; and

said rotor of said first electric motor is coupled with the

sun gear of said single pinion planetary gear train.

17. The hybrid driving unit as set forth in Claim 13, characterized in that said power splitting planetary gear comprises a double pinion planetary gear train;

said input shaft is coupled with said ring gear of said double pinion planetary gear train;

said output shaft is coupled with the sun gear of said double pinion planetary gear; and

said rotor of said first electric motor is coupled with the carrier of said double pinion planetary gear on the side of the rotor of said first electric motor.

18. The hybrid driving unit as set forth in Claim 4, characterized in that said second electric motor, said transmission, said power splitting planetary gear and said first electric motor are disposed in order from the side closer to said internal combustion engine.

19. The hybrid driving unit as set forth in Claim 18, characterized in that said input shaft is coupled with said first rotary element through the inner peripheral side of said second electric motor and said transmission;

said output shaft passes through said inner peripheral side of said first electric motor; and

said output element of said transmission is coupled with said output shaft through the outer peripheral side of said power splitting planetary gear.

20. The hybrid driving unit as set forth in Claim 19,

characterized in that said power splitting planetary gear comprises a double pinion planetary gear train;

said input shaft passes through between said transmission and said power splitting planetary gear and is coupled with the ring gear of said double pinion planetary gear train;

said output shaft is coupled with the carrier of said double pinion planetary gear on the side of the transmission through the inner peripheral side of said power splitting planetary gear;

said rotor of said first electric motor is coupled with the sun gear of said double pinion planetary gear; and

said output element of said transmission is coupled with the carrier of said double pinion planetary gear on the transmission side through the outer peripheral side of said power splitting planetary gear.

21. The hybrid driving unit as set forth in Claim 4, characterized in that said first electric motor, said transmission, said power splitting planetary gear and said first electric motor are disposed in order from the side closer to said internal combustion engine.

22. The hybrid driving unit as set forth in Claim 21, characterized in that said input shaft is coupled with said first rotary element through the inner peripheral side of said first electric motor, said transmission and said power splitting planetary gear; said output shaft passes through the inner peripheral side of said second electric motor

said output element of said transmission is coupled with said

output shaft through the outer peripheral side of said power splitting planetary gear; and

said rotor of said second electric motor is coupled with said input element of said transmission through the outer peripheral side of said power splitting planetary gear.

23. The hybrid driving unit as set forth in Claim 22, characterized in that said power splitting planetary gear comprises a double pinion planetary gear train;

said input shaft passes through the part between said power splitting planetary gear and said second electric motor and is coupled with said ring gear of said double pinion planetary gear train;

said output shaft is coupled with said carrier of said double pinion planetary gear on the side of said transmission through the outer peripheral side of said power splitting planetary gear;

said rotor of said first electric motor is coupled with the sun gear of said double pinion planetary gear through the inner peripheral side of said transmission; and

said output element of said transmission is coupled with said carrier of said double pinion planetary gear on the transmission side.

24. The hybrid driving unit as set forth in anyone of Claims 1 through 23, characterized in that said transmission has a planetary gear.

25. The hybrid driving unit as set forth in Claim 24, characterized in that said transmission has at least four shifting elements, said first shifting element is coupled with said rotor

of said second electric motor, said second shifting element is coupled with said output shaft and said transmission has braking elements which are capable of fixing said third and fourth shifting elements to said case, respectively.

26. The hybrid driving unit as set forth in Claim 24, characterized in that said planetary gear of said transmission comprises a Ravigneaux type planetary gear and the carrier of said Ravigneaux type planetary gear is coupled with said output shaft.

27. The hybrid driving unit as set forth in anyone of Claims 1 through 26, characterized in that one of said first and second electric motors is a device heavier than said power splitting planetary gear and said transmission.

28. The hybrid driving unit as set forth in Claim 1, characterized in that supporting members extending from said casing member support the both sides of said rotor of said electric motor disposed in the rearmost end among said first and second electric motors through an intermediary of bearing members; and

said mounting section is provided between said front supporting member and said rear supporting member.

29. The hybrid driving unit as set forth in Claim 1, characterized in that supporting members extending from said casing member support the both sides of said rotor of said electric motor disposed in the rearmost end among said first and second electric motors through an intermediary of bearing members; and

said mounting section is provided at the position on the rear side of said rear supporting member among said supporting members.

30. A vehicle, comprising an internal combustion engine, hybrid driving means and rear wheels as driving wheels to which driving force is transmitted from said hybrid driving means,

said vehicle being characterized in that said hybrid driving means is said hybrid driving unit described in anyone of Claims 1 through 29; and

said hybrid driving unit is disposed such that the input and output shafts on the axis are longitudinally disposed approximately on one and same axial line with a propeller shaft as said internal combustion engine is disposed on the front side of the body.